

**From:** [PETERSON Jenn L](#)  
**To:** [Burt Shephard/R10/USEPA/US@EPA](#); [Jeremy\\_Buck@fws.gov](#)  
**Cc:** [ANDERSON Jim M](#); [Eric Blischke/R10/USEPA/US@EPA](#); [Robert W. Gensemer](#); [Robert Neely](#)  
**Subject:** RE: Dioxin TRV - Fish  
**Date:** 09/24/2008 01:56 PM

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I only looked at Round 3 smallmouth bass, but the highest dioxin TEQ for fish I calculated was 70 pg/g at RM 7 (the bird TEQ was 261 pg/g!). I guess we will have to wait for the Round 3 screen to see concentrations in other fish species.

-Jennifer

-----Original Message-----

From: Shephard.Burt@epamail.epa.gov  
[mailto:Shephard.Burt@epamail.epa.gov]  
Sent: Wednesday, September 17, 2008 4:30 PM  
To: [Jeremy\\_Buck@fws.gov](#)  
Cc: [ANDERSON Jim M](#); [Blischke.Eric@epamail.epa.gov](#); [PETERSON Jenn L](#);  
[Robert W. Gensemer](#); [Robert Neely](#)  
Subject: RE: Dioxin TRV - Fish

Jeremy,

Thanks for the avian TEFs, I'll have to add them into my little spreadsheet, easy enough to add two more columns. The van den Berg et al. 1998 paper had a more comprehensive list of TEFs for non-ortho and mono-ortho substituted PCBs, they're also in the spreadsheet I sent out (minus the 'less than' sign in front of some of the TEFs), you would have missed them unless you scrolled down to the bottom of the spreadsheet. My template originally came from the state of Maine, don't know why the avian TEFs weren't in it.

You're also correct in your description of comparing a sum of dioxin/furan/PCB TEQ, expressed as a 2,3,7,8-TCDD concentration equivalent, as the value that would be compared from the Round 3 data (or any other data for that matter) to the 2,3,7,8-TCDD in tissue screening benchmark or TRV. That's exactly what is called for in the BERA problem formulation document. All of the Round 3 data needs screened.

The bigger question may be Jennifer Peterson's questions on the 2,3,7,8-dioxin screening value. So far, LWG has screened against the 90 pg/g value they derived. The tissue screening concentration I came up with (AWQC x BAF) was 50 pg/g. For what its worth, Phil Cook up at the Duluth EPA lab used a different methodology to obtain the same 50 pg/g aquatic life tissue TRV I came up with, its published in the EPA 1993 interim dioxin risk assessment for aquatic life (EPA/600/R-93/055). 6.4 pg/g value is the Oregon DEQ critical tissue level for fish. The other TRV proposed by LWG, 1.95 pg/g, was based on an estimated whole body concentration extrapolated from a measured egg residue resulting in reduced rainbow trout fry survival (Giesy et al. 2002). As the 1.95 pg/g value is not a measured residue-effect, its hard to base a TRV on it, it also won't show up in any compendium of measured residue-effects studies. The 6.4 pg/g critical tissue level is lower than any residue-effects concentration for any toxicological endpoint except for the aforementioned Giesy et al. 2002 rainbow trout egg residue study.

Except for Giesy et al. 2002, the lowest residue-effects for 2,3,7,8-TCDD on survival, reproduction, growth or behavior start showing up at 44 pg/g. There are some biochemical and morphological effects between 6.4 and 44 pg/g, but no effects that line up with the BERA assessment endpoints. I've pulled out what I currently have on 2,3,7,8-TCDD residue effects from my spreadsheet so you can compare it to the various benchmarks, don't know if much has been added to dioxin since I sent out the full spreadsheet of all chemicals earlier in the TRV derivation process. ERED will have more information, including the higher residue-effect values instead of just the lowest effect residues I try to compile.

Bottom line, at this point in time, I agree with Eric. I don't see a reason to derive a BERA tissue TRV for 2,3,7,8-TCDD, as it looks like everything screens out using either 90 pg/g or 50 pg/g as the screening level benchmark. Calculation of TEQs should address risks from dioxins, furans and the non- and mono-ortho substituted PCBs. If the highest TEQ is in the vicinity of 30 pg/g, it looks to me as though dioxin in the Round 3 data will also screen out.

Best regards,

Burt Shephard  
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"If your experiment needs statistics to analyze the results, then you

ought to have done a better experiment"  
- Ernest Rutherford

(See attached file: 2378-TCDD residue effects.xls)

Jeremy\_Buck@fws.  
gov

09/16/2008 01:39  
PM

"Robert W. Gensemer"  
<rgensemer@parametrix.com>

To

cc

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Subject  
RE: Dioxin TRV - Fish

Just for clarity and to make sure we are all on the same page (i.e., I assume we are all in agreement on the following, but it has been discussed differently at various times)-

To represent total dioxin-like activity in a sample (i.e., a fish sample), a TEQ value should be calculated which incorporates TEFs for dioxins, furans, and planar PCBs. Calculating a dioxin only TEQ without dioxin-like PCBs, or a PCB TEQ without dioxins and furans, would not be appropriate at a site which has both dioxins and PCB compounds represented in tissues. Doing so would result in a low estimate of TEQs. I still do not know why LWG conducted them separately. It is more work to do it separately and increases data output which we just have to combine anyway.

There are essentially no fish-based TEFs for planar PCBs, so when calculating a TEQ for protection of fish themselves, only dioxins and furans would be used. For mammals and birds, calculations of TEQs in fish samples should include the avian- or mammalian-based TEFs. This is why we end up with multiple TEQ values for every sample, which reflects the resource we are trying to protect.

A TRV for dioxin-like activity should be based on TEQs (not just 2378 TCDD). However, one can consider a TEQ value (i.e., in fish) that is calculated with dioxins, furans, AND planar PCBs (or just with dioxins and furans if trying to protect fish themselves) that is under a 2378 TCDD screening value as being protective without determining a full TEQ-based TRV.

PAHs and some other compounds also exert some dioxin-like activity, but we are not incorporating any TEFs for these compounds into this risk assessment.

"Robert W.  
Gensemer"  
<rgensemer@parametrix.com>

09/15/2008 11:35  
AM

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Subject

RE: Dioxin TRV - Fish

Eric: The other reason we did not develop a dioxin TRV is that we also considered the fish tissue TEQ screen that was done in the round 2 report that also screened out dioxin TEQs (and PCB TEQs, I believe). I don't immediately recall the table number in the round 2 report with that screen, but I can find it if needs be.

-Bob

-----Original Message-----

From: Blischke.Eric@epamail.epa.gov  
[mailto:Blischke.Eric@epamail.epa.gov]  
Sent: Monday, September 15, 2008 10:11 AM  
To: PETERSON Jenn L  
Cc: ANDERSON Jim M; Shephard.Burt@epamail.epa.gov; Jeremy\_Buck@fws.gov;  
Robert Neely; Robert W. Gensemer  
Subject: Re: Dioxin TRV - Fish

Jennifer, we went with the 90 pg/g screening criteria for 2,3,7,8-TCDD. We did not look at other dioxin congeners. Based on this screening step, only one sample - a lumbriculus sample collected offshore of the RPAC outfall - exceeds this criteria. As a result, we did not develop TRVs for dioxin.

I just performed a 2,3,7,8-TCDD screen for all tissue data (including Round 3B) collected at Portland Harbor. The highest 2,3,7,8-TCDD fish tissue concentration was a Round 1 smallmouth bass sample collected in the vicinity of RM 7 at 1.49 pg/g (ng/kg).

Burt and Bob, is my recollection accurate?

Eric

"PETERSON Jenn L" <PETERSON.Jenn@deq.state.or.us> 09/15/2008 08:59 AM	To Eric Blischke/R10/USEPA/US@EPA, Burt Shephard/R10/USEPA/US@EPA cc "ANDERSON Jim M" <ANDERSON.Jim@deq.state.or.us>, "Robert Neely" <Robert.Neely@noaa.gov>, <Jeremy_Buck@fws.gov> Subject Dioxin TRV - Fish
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What was the decision on the development of a dioxin TRV for fish? Was the Round 3 Data screened for dioxin TEQ?

-Jennifer